

shown (I am not aware that it can) that he had definitely correlated them with (Lower) Cambrian beds. T. G. BONNEY
St. John's College, Cambridge, December 11

Self-Fertilisation in Flowers

DR. MÜLLER (NATURE, vol. xiv. p. 571) and Prof. Asa Gray (vol. xv. p. 24) reflect on your abstract of my verbal remarks (vol. xiv. p. 475) on *Browallia* in a way not particularly complimentary to me. Prof. Gray admits having read the full report, and yet fails to notice that "February 8," is there given as the date of my remarks. Had he not overlooked this, he would not have wondered that I did not see "Hymenoptera and Lepidoptera of various sorts" visiting them. As reported in the *Proceedings of the Society*, I exhibited fresh specimens in fruit at the meeting of that date, which is about mid-winter with us, when these insects are at rest. The plants were of course grown under glass, and when I say "*Browallia* is not visited by insects, yet seeds abundantly," I am referring naturally to the experience I am describing. If one be justified in taking an unguarded expression, or even a whole sentence, without any regard to the subject matter of its connection, we might have as many "theories" in science as there are sects in religion, all founded on isolated "texts" in Scripture. It is remarkable that in a paper in which Prof. Gray is commenting on hasty observations, in another he should have overlooked a fact like this. I do not say *Browallia* is never visited by insects, but I do say that they do not visit them *under such circumstances as I was describing*.

Of the fact there is no doubt, of the interpretation there may be many opinions; and no one respects an opinion by Prof. Gray, when he carefully considers it, more highly than I. Yet I would respectfully submit, that even though an insect were as careful to avoid the "brush" which almost closes the throat, though it were able to be as careful in finding the chink as Dr. Gray was in his manipulations with the hog's bristle, the obstruction of the mouth in the way it is cannot surely be claimed as an arrangement in favour of cross-fertilisation.

Dr. Müller seems to believe that I do not know that "many flowers have recourse to self-fertilisation when not visited by insects." If he will examine the *Proceedings* of the Am. Association for 1875, p. 247, he will find that I have given him the credit of the observation, and the fact itself such consideration I thought it in justice entitled to. The impression which Dr. Müller's expression warrants, that he has not had the opportunity of reading the numerous observations I have placed on record during the last few years, in relation to this and kindred topics, fully excuses him in my mind for his sharp comments.

THOMAS MEEHAM

Germantown, Philadelphia, Nov. 21

On Supersaturated Solutions

IN a paper communicated to the Royal Society last May I described some experiments to show that the open air and the air of ordinary rooms do not generally contain crystals of the various salts which form supersaturated solutions. It has been remarked to me that I did not give the strength of the solutions, so that doubt might arise as to whether the results would hold good for very strong solutions:—The following experiments set that question at rest. I made a very strong solution of sodium sulphate which threw down abundance of anhydrous salt on boiling. When cold a good half inch of anhydrous salt remained at the bottom of the test-tube. Took this into my garden, which is near Bristol. Took up some of the solution in a clean pipette and put drops on the leaves of peonies, which were very dusty, on geraniums, on moss, on the stone coping of Bath oolite, and on the painted woodwork of the railings and garden door. Not a single drop crystallised. Made a drop set quite solid by dropping in earth with the fingers. N.B.—I had been at work with the salt for some time and crystals were probably adhering to my finger. Earth not touched inactive. The drops sank into the moss slowly, remaining quite liquid. Those on the stone were soon absorbed and dried up on the surface; fresh drops put on these remained liquid. Smear a drop repeatedly with the finger which had been cleansed; inactive, as fresh drops remained liquid on it. Drop on flower-pot, inactive, smeared with finger; when dry inactive to fresh drops. These and other drops on the flower-pot slowly formed a film of 7-atom salt. Stirred the solution with a dry twig picked off the ground, inactive. The drops on the leaves all slowly evaporated, giving the 7-atom salt. Finally, made some of the drops and the original

solution crystallise, to prove that they were really supersaturated. These experiments were made both in sun and shade. Weather dry. The test-tube was left open the whole time.

On another occasion I took a flask of sodium sulphate containing a large quantity of the 7-atom salt into the garden in the evening. Put drops on a flower-pot; one only crystallised. Put a lump of dry earth into one drop, and added more solution; did not crystallise. Made a little mud pie by breaking this up with the pipette, inactive; pipette repeatedly inactive in the solution after touching this. Brought a crystal to the earth; crystallised at once all through the mass.

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J. G. GRENFELL

KARL ERNST VON BAER

SCIENCE has sustained a great loss by the death of Dr. Karl Ernst von Baer, the eminent biologist; he died at Dorpat on November 29, in his eighty-fifth year. Von Baer was born in Esthonia on February 29, 1792, and while yet at the gymnasium became an earnest student of botany. He studied medicine at Dorpat in 1810-14, whence he proceeded to Vienna for the study of clinical medicine, to Würzburg, where he gave special attention to comparative anatomy, and to Berlin, where he studied magnetism, electricity, crystallography, and geology. In 1817 he went to Königsberg as prosecutor to Prof. Burdach, and two years later he became professor of zoology at the same university. In 1826 he succeeded Burdach in the chair of anatomy, accepted an invitation in 1829 from the St. Petersburg Academy, but returned to Königsberg the following year. A few years later, in 1834 he was again invited to St. Petersburg, where he became one of the most active members not only of the Academy, but also of the Geographical and Economical Societies. Von Baer's writings, marked by philosophic depth, are, on account of their orderly and clear exposition, as attractive as they are generally intelligible. The subject of the origin and development of organic bodies, which had special attractions for him, he did much to clear up. The foundation of his eminence he laid in Königsberg, where he published in 1827 his "*Briefe über die Entstehung des Eies*," which was soon followed by the important works "*Entwicklungsgeschichte der Thiere*," and "*Geschichte der Entwicklung der Fische*." These works, which are yet of great value, have earned for their author the title of Father of Comparative Embryology.

In the summer of 1837 von Baer made a journey of exploration from Archangel to Novaya Zemlya, and his report is still one of the most valuable sources of information upon that island. In 1851 his attention was attracted to the immense Russian fisheries and the irrational methods used. During 1851-6 he investigated the fisheries of Lake Peipus, the Gulf of Finland, and the Caspian Sea, publishing the results of his investigations in a great work in 1859. The name of Baer is connected with more than one improvement in the fisheries, and some important additions were made to the trade, thanks to his efforts. His remarkable work, "*Kaspische Studien*," has had no rival. It would be impossible to enumerate the various subjects upon which he has thrown clear light in his writings. The laws of excavation of river-beds, the navigability of the Arctic seas, the steppes and forests of Southern Russia, the Glacial period, the Siberian mammoths, the potato disease, were at various times treated by him, and in each department von Baer opened out new and extensive fields of inquiry. His acquirements in zoology, comparative anatomy, embryology, physiology, and anthropology are well known; moreover ethnography, the early history of mankind, archaeology, and the science of language will count him among their most eminent students. In his later years, besides various anthropological papers, he published an autobiography (which appeared soon after the fiftieth anniversary—1864—of his scientific career), his "*Reden*," and "*Kleine Aufsätze vermischten Inhalts*"

(1864-75). The very valuable publication he undertook along with M. Helmersen, "Beiträge zur Kenntniss des russischen Reichs," numbers twenty-six volumes, and continued to appear until within the last few years. Von Baer continued to work up to the very last, and he has left behind him a large quantity of manuscripts and unfinished works.

Von Baer was undoubtedly one of the most accomplished investigators of the present century. Haeckel speaks of him thus:—"If among living scientific investigators there is one who justly enjoys universal honour and respect it is Karl Ernst Baer; and if classical and in the best sense natural philosophical writers will admire a Coryphæus of to-day, an unsurpassed example of exact observation and philosophic reflexion, let them go to the 'Entwicklungsgeschichte' of this head master of our science." Helmersen speaks of the late biologist as follows in the *St. Petersburg Zeitung*:—"With Baer departs a man such as is rarely met with in any century, a genial man of science and research, endowed with a penetrating critical intellect, with unusual faculty of observation, with perseverance and energy in work. The earth and its inhabitants were the great field of his research, and he brought to his work not only a deep philosophic training, but also an equipment of the profoundest knowledge in several departments of natural science which few of the great spirits of our time have possessed. This great, comprehensive, but profound knowledge, which he to the day of his death continued to increase and turn to use, combined with the determination to trace things to their ultimate grounds and by means of keen and unprejudiced, clearly arranged, and thoughtful observations to discover the truths and the laws of nature, stamp all his works with a monumental character which they will preserve for all time. The widely-known name of Baer is written in large letters in the book of science and its history."

We hear that a subscription will be opened among all the scientific bodies of which von Baer was a member for the founding of a scholarship in his name, or for any other scientific purpose worthy of the name of the great natural philosopher.

DAVID FORBES

AT the comparatively early age of forty-eight the busy life of Mr. David Forbes has been brought to a close. Like his distinguished brother Edward, he has been unexpectedly cut off before much of the immense mass of knowledge he had acquired has been put in a form to be of use to others. He was always looking forward to a time of less active occupation, when he might devote his principal attention to putting on record the results of his many years' investigations. What there may be in the piles of manuscript he has left that will be available for use, there has not yet been time to ascertain. For the last five years the most important papers he wrote were the half-yearly reports for the Iron and Steel Institute, but among his earlier papers there will be recollected "The Relation of Silurian and Metamorphic Rocks in the South of Norway," and "The Geology of Bolivia and South Peru." Alluding to his connection with the Iron and Steel Institute, the organ of that society has just written:—"In his capacity of Foreign Secretary he has, almost from the foundation of the institute, rendered most essential service, and has in no inconsiderable degree contributed to that rapid prosperity which has characterised its operations. His exhaustive reports on the foreign iron and steel industries which appeared in the *Journal* were most valuable, as they embraced everything going on in connection with the iron trade all over the world. The wonderful linguistic accomplishments of Mr. Forbes enabled him to deal easily with the publications of all

countries where iron and steel is made. His name was so well known abroad that the leading people connected with the technological features of ironmaking most readily furnished full details of what was going on in each country; and through his influence mainly the institute speedily assumed a recognised position abroad."

Mr. Forbes joined the Geological Society in 1853, and since February, 1871, has been one of the secretaries. He was also a Fellow of the Chemical Society. In June, 1856, he was elected a Fellow of the Royal Society. He had travelled extensively in many parts of the world. All the family of the Manx Forbesees have been great travellers. Dr. Wilson, in his memoir of Edward Forbes, has mentioned many of his relatives who died out of Europe. Mr. David Forbes, as a consulting engineer, had an extensive practice, and was often summoned abroad. His death occurred at his house on Tuesday, December 5, and on Monday, the 11th, his remains were laid in the Kensal Green Cemetery, in the presence of the Presidents of the Geological and Chemical Societies and many scientific friends.

THE GLACIATION OF THE SHETLAND ISLES

IN the *Geological Magazine* for May and June, 1870, my colleague, Dr. Croll, first pointed out that the Scotch and Scandinavian ice-sheets probably united on the floor of the North Sea, and thence moved northwards towards the Atlantic. He was led to this conclusion by a consideration of the peculiar direction of the striæ in Caithness, in Shetland, and the Faroe Isles, as well as by the occurrence of marine shells in the boulder clay of the northern parts of Caithness. He showed that the enormous *mer de glace* which pressed out on all sides from Scandinavia forced its way close to the Scotch coastline, and in virtue of its greater size produced a slight deflection of the Scotch ice, causing it to over-ride portions of the main land. He stated that in all likelihood both the Shetland and the Faroe Isles were over-topped by the Scandinavian ice in its onward march towards the Atlantic.

During a recent traverse in Shetland I obtained evidence which tends to strengthen this remarkable theory. In the north island of Unst, the direction of the striæ, the boulders on the surface, and the stones in the till, clearly indicate that this island was glaciated by a mass of ice moving from east to west. The proofs of continental glaciation, which are comparatively clear in the north, are obscured in a great measure in the main island by the effects of a local ice-sheet. The nature of the boulder clay, as well as the trend of the striæ in various localities, show that the movement of this local sheet was influenced by the general features of the country. In addition to these markings, however, others were found which could not have been produced by ice shedding off the land in the ordinary way. These cross the island, regardless of its physical features, and are often at right angles to the newer set. Lastly, the wide distribution of morainic matter with groups of moraines indicate the gradual disappearance of the local ice-sheet and the presence of small glaciers, where the ground presented favourable conditions for their development.

The islands are dotted over with small lochs; the most of these lie in peat or drift, while others occupy true rock basins. The singular absence of marine terraces ought not to escape notice, as bearing on the recent geological history of these islands, since the voes or sea-lochs are admirably adapted for their preservation.

These observations will be described in detail in a forthcoming paper before the Geological Society.

JOHN HORNE

Geological Survey of Scotland, Nairn, N.B.,
November 29